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10/806,456	03/23/2004	Taiji Nishi	250858US2	1229

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EXAMINER	
RAMDHANIE, BOBBY	

ART UNIT	PAPER NUMBER
1797	

NOTIFICATION DATE	DELIVERY MODE
11/17/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/806,456	NISHI ET AL.	
	Examiner	Art Unit	
	BOBBY RAMDHANIE	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19,36 and 37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19,36 and 37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks, filed 08/06/2008, with respect to the rejection(s) of claim(s) 1-19, 36, & 37 under 102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Reinecke et al.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-5, 7-11, 13, 17-19, & 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reinecke et al (US5716741).

4. Applicants' claims are towards a process.

5. Regarding Claims 1-5, 7-11, 13, 17-19 & 35-37, Reinecke et al discloses the process of producing a resin molded product, comprising: A). Forming a resist pattern on a substrate (See Figures 1-6 Items 1 4 & 12); B). Forming a metal structure by depositing a metal in accordance with the resist pattern on the substrate (See Figure 9 Item 9); and C). Forming a resin molded product by using the metal structure, wherein the forming a resist pattern comprises: Forming a plurality of resist layers on the substrate (See Figures 1-6 Items 1, 4, & 12). Reinecke et al does not explicitly state that the upper resist layer has a lower solubility than the lower resist layer. Reinecke et al does however disclose how the change the solubility of the resist layers by irradiation (See Column 4 lines 17-20) and also suggest using different concentrations of the solvent or developer or even heating the developer to obtain a desired amount of removal of the resist layer (See Column 6 lines 25-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include explicitly D). Developing the plurality of resist layers through solubility control in such a way that an upper resist layer has lower solubility in a developer than a lower resist layer because Reinecke et al discloses that the layers (resist) to be removed can be dissolved out selectively (See Column 6 lines 23-25).

6. Additional Disclosure included: Claim 5: Wherein the forming a resist pattern comprises, before the developing the plurality of resist layers: A). Exposing the lower resist layer (See Column 3 lines 10-14); and B). Exposing the upper resist layer (See Column 3 lines 29-32), and the solubility control comprises exposure control for controlling an amount of exposure of the lower resist layer and the upper resist layer

(See Column 4 lines 16-17); Claim 8: B). Wherein the forming a resist pattern comprises: a step of depositing a plurality of resist layers; and exposing the plurality of resist layers at a time with an exposure mask or exposing each of the plurality of resist layers with an exposure mask of the same pattern, to form a pattern with a predetermined height (Column 5 lines 12-27); Claim 10: Wherein forming a resist pattern further comprises depositing and exposing one or more resist layers after exposing the upper resist layer (See Column 5 lines 13-16 upper resist layer is defined as the last layer deposited), to create a raised or recessed portion with two or more different heights (See Figures 6 & 9, two or more different heights are shown); Claim 17: Wherein a height of a raised or recessed portion of a resin molded product formed by the forming a resin molded product is substantially 5 μm to 500 μm (See Column 9 lines 51-61); Claim 36: Reinecke et al discloses a process according to Claim 1, wherein the metal structure used for the forming a resin molded product, has an uneven surface used for material processing and the forming a resist pattern developing the lower resist layer exposed with a mask pattern (See Column 3 lines 10-14) and the upper resist layer exposed with a mask pattern of the plurality of the resist layers (See Column 3 lines 36-40), to form a resist pattern having a raised or recessed portion with a plurality of different heights (See Figure 11C Items 22 & 25); Claim 37: Reinecke et al discloses a process according to Claim 1 wherein the metal structure used for the forming a resin molded product, has a groove with a width of 2 μm to 500 μm and an aspect ratio of 1 or more, and a through-hole connected to the groove, and the forming a metal structure further comprises: forming a first structure having an uneven surface (Figure 6 Item 11,

adhesion layer has an uneven surface); B). Forming a resist layer of a plurality of resist layers on the uneven surface of the first structure (Figures 1-6 Items 1, 2, & 12); C). Forming a resist pattern by forming a raised portion of the resist pattern on a raised portion of the uneven surface of the first structure, or by forming a recessed portion of the resist pattern on a recessed portion of the uneven surface of the first structure (Figure 8; Item 17a; regions are readily soluble), and D). A step of forming a second structure by depositing material for the second structure on the uneven surface of the first structure where the resist pattern is formed (Figure 9 Item 18).

7. For Claim 13: Reinecke et al discloses a process of producing a resin molded product having a groove with a width of 2 to 500 μm (See Column 11 lines 51-61) and an aspect ratio of 1 or more (See Column1 lines 23-26; LIGA defines a method of high aspect ratio), and a through-hole (See Figure 11C), comprising: A). Forming a metal structure (See Column 9 lines 35-41); and B). Forming a resin molded product (See Column 9 lines 44-46), wherein the step of forming a metal structure comprises: Forming a first structure having an uneven surface (See Figure 6 Item 11, adhesive surface has a uneven structure); Forming a resist layer on the uneven surface of the first structure (See Figure 6 Item 12); Forming a resist pattern by forming a raised or recessed portion of the resist pattern on a raised portion of the uneven surface of the first structure, or by forming a recessed or raised portion of the resist pattern on a recessed portion of the uneven surface of the first structure (See Figure 7 Items 12, 14, & 15); and Forming a second structure by depositing material for forming the second structure on the uneven surface of the first structure where the resist pattern is formed

(See Abstract, repeating number of resist layers). Reinecke et al does not explicitly state that the upper resist layer has a lower solubility than the lower resist layer. Reinecke et al does however disclose how the change the solubility of the resist layers by irradiation (See Column 4 lines 17-20) and also suggest using different concentrations of the solvent or developer or even heating the developer to obtain a desired amount of removal of the resist layer (See Column 6 lines 25-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include explicitly D). Developing the plurality of resist layers through solubility control in such a way that an upper resist layer has lower solubility in a developer than a lower resist layer because of the fact that Reinecke et al discloses that the layers (resist) to be removed can be dissolved out selectively (See Column 6 lines 23-25).

8. For Claim 7: Reinecke et al discloses a process of producing a resin molded product having an uneven surface used for material processing, comprising: A). Forming a resist pattern on a substrate (See Figures 1-6 Items 1 4 & 12); B). Forming a metal structure by depositing a metal in accordance with the resist pattern on the substrate (See Column 4 lines 53-60 or Figure 4 Item 9, the copper layer takes the form of the resist); and C). Forming a resin molded product by using the metal structure, wherein the step of forming a resist pattern comprises: a step of forming a plurality of resist layers (See Example; Column 8 to Column 9, See Item 4 which is relabeled as Item 8; and Item 12 & the Abstract which states the process is repeated as many times as possible); and developing a lower resist layer exposed with a mask pattern (See Figure 3 Items 5 & 6) and an upper resist layer exposed with a mask pattern of the

plurality of the resist layers (See Figure 7 Item 14 in relation to Abstract which states the process is repeated from one to several times), to form a resist pattern having a raised or recessed portion with a plurality of different heights (See Column 1 lines 35-39). Reinecke et al does not explicitly state that the upper resist layer has a lower solubility than the lower resist layer. Reinecke et al does however disclose how the change the solubility of the resist layers by irradiation (See Column 4 lines 17-20) and also suggest using different concentrations of the solvent or developer or even heating the developer to obtain a desired amount of removal of the resist layer (See Column 6 lines 25-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include explicitly D). Developing the plurality of resist layers through solubility control in such a way that an upper resist layer has lower solubility in a developer than a lower resist layer because of the fact that Reinecke et al discloses that the layers (resist) to be removed can be dissolved out selectively (See Column 6 lines 23-25).

9. Additional Disclosures Included: Claim 9: Wherein forming a resist pattern comprises: depositing a plurality of resist layers (See Abstract); and exposing the plurality of resist layers at a time with an exposure mask or exposing each of the plurality of resist layers with an exposure mask of the same pattern, to form a pattern with a predetermined height (See Column 2 lines 40-45); Claim 11: Wherein the forming a resist pattern further comprises depositing and exposing one or more resist layers after exposing the upper resist layer, to create a raised or recessed portion with two or more different heights (See Figures 6 & 9, two or different heights are shown); Claim 18: Wherein a height of a raised or recessed portion of a resin molded product formed by

the forming a resin molded product is substantially 5 μm to 500 μm (See Column 9 lines 51-61); Claim 19: Wherein a height of a raised or recessed portion of a resin molded product formed by the forming a resin molded product is substantially 5 μm to 500 μm (See Column 9 lines 51-61);

10. Regarding Claim 12, Reinecke et al discloses a process of producing a resin molded product according to Claim 7, except wherein forming a resist pattern forms a resist pattern having a raised or recessed portion with a plurality of different heights in one development step. Reinecke et al does however, disclose a series of resist patterns having raised or recessed portions with one height in each development step (See Figures 3-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the resist patterns to include a plurality of different heights in one development step because this would decrease the process time for making the resin molded product when a single rinse is performed.

11. Claims 2-4, 6, 14, 15, & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reinecke et al in view of Hashimoto et al (US5527662).

12. Applicants' claims are towards a process for producing a resin molded product.

13. Regarding Claims 2-4, Reinecke et al discloses the process according to Claim 1 except wherein the solubility control comprises heat treatment control performed before developing the plurality of resist layers, for controlling an amount of heat-treatment of the lower resist layer and the upper resist layer. Hashimoto et al discloses a process for producing a resin molded product wherein the solubility control comprises heat treatment control performed before the development step, for controlling amount of

heat-treatment of the lower resist layer and the upper resist layer (See Column 3 lines 29-43; high molecular weight organic film and inorganic film both may define a lower and an upper resist layer, note specifically the heat treatment after each step before development of the layers). It would have been obvious to one of ordinary skill in the art to modify the process of Reinecke et al with the heat treatment before the development processing of Hashimoto et al because the incorporation of the PMMA resist layer consisting of an acid-decomposable polymer, an acid generator, and a conducting polymer which would allow for higher sensitivity of the electron beam of Reinecke et al.

14. Additional disclosures included: Claim 3: Wherein forming a resist pattern comprises: A). Performing heat-treatment of the lower resist layer before exposure of the lower resist layer; and performing heat-treatment of the upper resist layer before exposure of the upper resist layer (Column 3 lines 29-43); Claim 4: Wherein forming a resist pattern comprises: performing heat-treatment of the lower resist layer after exposure of the lower resist layer; and performing heat-treatment of the upper resist layer after exposure of the upper resist layer (See Column 3 lines 44-48);

15. Regarding Claim 6, both Reinecke et al and Hashimoto et al disclose the process of producing a resin molded product according to Claim 1. The combination of Reinecke et al and Hashimoto et al further discloses the lower resist layer and the upper resist layer are made of resist of which solubility in a developer changes by exposure and heat treatment (See Reinecke et al, Column 4 lines 11-12 & Hashimoto et al (See column 5 lines 4-50). The combination of Reinecke et al and Hashimoto et al discloses however the forming a resist pattern comprises, before the developing the plurality of

resist layers, exposing the lower resist layer; and performing heat treatment of the upper resist layer after exposing the upper resist layer. The combination does not disclose depositing the upper resist layer without performing heat treatment of the exposed lower resist layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include this step in view of the disclosures of Reinecke et al and Hashimoto et al as a matter of design choice for the three dimensional structures or form one would like to manufacture.

16. Regarding Claim 14, Reinecke et al discloses the process according to Claim 1 except wherein a light source used for exposure in the step of forming a resist pattern is an ultraviolet lamp or a laser. Reinecke et al does however disclose the use of x-ray irradiation for exposure (See Column 5 lines 21-26). Hashimoto et al discloses the use of ultraviolet lamp (See Column 1 line 20) or a laser (See Column 1 line 15 – focus ion beam). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the irradiation course of Reinecke et al to be an ultraviolet lamp or laser because according the Hashimoto et al, the use of a shorter wavelength light source (x-ray irradiation) invites a drawback of smaller focus depth (See Column 1 lines 20-24).

17. Regarding Claim 15, Reinecke et al discloses the process according to Claim 7 except wherein a light source used for exposure in the forming a resist pattern is an ultraviolet lamp or a laser. Reinecke et al does however disclose the use of x-ray irradiation for exposure (See Column 5 lines 21-26). Hashimoto et al discloses the use of ultraviolet lamp (See Column 1 line 20) or a laser (See Column 1 line 15 – focus ion

beam). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the irradiation course of Reinecke et al to be an ultraviolet lamp or laser because according the Hashimoto et al, the use of a shorter wavelength light source (x-ray irradiation) invites a drawback of smaller focus depth (See Column 1 lines 20-24).

18. Regarding Claim 16, Reinecke et al discloses the process according to Claim 11 except wherein a light source used for exposure in the step of forming a resist pattern is an ultraviolet lamp or a laser. Reinecke et al does however disclose the use of x-ray irradiation for exposure (See Column 5 lines 21-26). Hashimoto et al discloses the use of ultraviolet lamp (See Column 1 line 20) or a laser (See Column 1 line 15 – focus ion beam). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the irradiation course of Reinecke et al to be an ultraviolet lamp or laser because according the Hashimoto et al, the use of a shorter wavelength light source (x-ray irradiation) invites a drawback of smaller focus depth (See Column 1 lines 20-24).

Telephonic Inquiries

19. The Examiner would like to bring to the attention of the applicants a prior art document which was furnished by the applicants: JP2001-338444. This document explicitly discloses the limitations of the independent claims and specifically wherein the upper resist layer is of a lower solubility than the lower resist layer in a plurality of layers

in a resist pattern (Please see [0019]-[0023], [0033], [0034], [0043]-[0045], & See Claims of JP2001-338444).

20. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BOBBY RAMDHANIE whose telephone number is (571)270-3240. The examiner can normally be reached on Mon-Fri 8-5 (Alt Fri off).

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. R./

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797